

WE CLAIM:

1. A system for measuring and remotely monitoring strain in an element comprising:

a sensor for measuring strain in said element producing an electrical signal representative thereof;

a telemetry circuit electrically coupled to said sensor for encoding and transmitting the signal representative of strain; and

a reader module remotely located from said sensor and said telemetry circuit for receiving the signal representative of strain.

2. A system for measuring and remotely monitoring strain in an element as claimed in claim 1 further comprising;

a housing for encapsulating said sensor and said telemetry circuit.

3. A system for measuring and remotely monitoring strain in an element as claimed in claim 2 wherein said housing is comprised of bio-compatible material capable of implantation in a living organism.

4. A system for measuring and remotely monitoring strain in an element as claimed in claim 1 wherein said sensor for measuring strain is a capacitive sensor.

5. The system for measuring and remotely monitoring strain in an element as claimed in claim 1 wherein said sensor

for measuring strain is a cantilever beam type capacitive sensor.

6. The system for measuring and remotely monitoring strain in an element as claimed in claim 1 wherein said sensor for measuring strain is a surface acoustic wave sensor.

7. The system for measuring and remotely monitoring strain in an element as claimed in claim 1 wherein said sensor for measuring strain is a miniaturized strain gauge.

8. The system for measuring and remotely monitoring strain in an element as claimed in claim 3 wherein said housing is substantially annular for placement around an orthopedic implant rod.

9. The system for measuring and remotely monitoring strain in an element as claimed in claim 1 wherein said reader module further comprises a concomitant removable memory card for storing sensor data.

10. The system for measuring and remotely monitoring strain in an element as claimed in claim 9 wherein said reader module is battery powered.

11. A system for measuring and remotely monitoring strain in an element comprising:

a sensor for measuring static and dynamic strain in said element producing an electrical signal representative thereof;

a telemetry circuit electrically coupled to said

sensor for encoding and transmitting the signal representative of strain;  
a reader module remotely located from said sensor and said telemetry circuit for receiving the signal representative of strain and for transmitting power to said telemetry circuit; and  
a control module in communication with said reader module for storing and processing the signal representative of strain.

12. The system for measuring and remotely monitoring strain in an element as claimed in claim 11 wherein said sensor for measuring strain is a capacitance sensor.

13. The system for measuring and remotely monitoring strain in an element as claimed in claim 11 wherein said sensor for measuring strain is a cantilever beam type capacitive sensor.

14. The system for measuring and remotely monitoring strain in an element as claimed in claim 11 further comprising:  
a bio-compatible housing for encapsulating said sensor and said telemetry circuit.

15. The system for measuring and remotely monitoring strain in an element as claimed in claim 14 wherein said housing is substantially annular for placement around an orthopedic implant rod.

16. The system for measuring and remotely monitoring

strain in an element as claimed in claim 14 wherein said sensor is secured to said housing and wherein the strain in said element is transmitted to said sensor through said housing.

17. The system for measuring and remotely monitoring strain in an element as claimed in claim 15 wherein said sensor is secured to said housing and wherein the strain in said element is transmitted to said sensor through said housing.